



## Course syllabus

Faculty of Technology

Department of Mechanical Engineering

4MT320 Materialmekanik, 7,5 högskolepoäng

Material mechanics, 7.5 credits

### **Main field of study**

Mechanical Engineering

### **Subject Group**

Mechanical Engineering

### **Level of classification**

Second Level

### **Progression**

A1N

### **Date of Ratification**

Approved 2019-06-10

Revised 2019-12-19 by Faculty of Technology. Revised literature

The course syllabus is valid from spring semester 2020

### **Prerequisites**

General entry requirements for second-cycle studies, plus specific entry requirements:

- 22,5 credits in Algebra and Analysis; 7,5 credits in Solid mechanics or similar
- English B/English 6.

## Objectives

After completing the course the student shall be able to:

- describe the fundamental concepts of continuum mechanics that are needed for analyzing the deformation of solids
- describe the elastic and inelastic deformation mechanisms of common engineering materials
- decide what material models are appropriate for a certain application or simulation
- apply different material models in simple calculation examples
- predict the temperature- and deformation rate-dependence of materials
- estimate the risk of fracture and failure of loaded structures.

## Content

The course comprises the following elements:

- Deformation mechanisms in engineering materials
- Constitutive models
- Elasticity theory
- Plasticity theory
- Visco-elasticity
- Creep
- Composites
- Fracture mechanics and fatigue

## Type of Instruction

The teaching consists of lectures, laboratory exercises, and tutorials. Participation in the laboratories is mandatory.

## Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The examination consists of two parts, a written examination and a laboratory report. The report of the laboratory work (1 credit) is assessed by fail or pass. The written examination (6,5 credits) is assessed with the detailed grades indicated above. Both parts must be approved before the course is passed. The final grade is given by the grade of the written examination.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customized exam or to have the student conduct the exam in an alternative way.

## Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

## Required Reading and Additional Study Material

### Required reading

Joachim Roesler, Harald Harders, Martin Barker: Mechanical Behaviour of Engineering Materials, Springer, 2010. Latest edition, 534 pages